



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/614,855

07/07/2003

Xiao-An Zhang

200300074

9152

22879 7590 06/12/2007

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

RUDE, TIMOTHY L

ART UNIT

PAPER NUMBER

2871

MAIL DATE

DELIVERY MODE

06/12/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/614,855

Applicant(s)

ZHANG ET AL.

Examiner

Timothy L. Rude

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 2-12, 14-16, 18-28 and 30-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 13, 17, 29 and 33-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20070205</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 22 December 2006 has been entered.

Claims

Claims remain unchanged since the Final Rejection mailed 22 September 2006.

Claim Objections

Objections to claims 35 and 39 are withdrawn. Please reference Applicant's arguments filed 22 December 2006, page 9.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald et al (Devonald) USPAT 5,275,924 in view of Zhang et al (Zhang) US PG PUB 2002/0075557 A1.

As to claims 1 and 17, Devonald discloses a method of making a non-centrosymmetric bistable switchable film [(electro-optic memory) col. 9, lines 52-68 and col. 32, line 40 through col. 34, line 17] that is a three-dimensional [col. 10, lines 15-25

and 50-65] molecular switch assembly, formed on a substrate, said molecular assembly comprising:

a first monolayer of seed molecules for initiating self-assembled molecular growth, said first monolayer formed on said substrate [end of molecule, col. 1, line 54];

a second monolayer of active molecules comprising a plurality of rotor moieties and stator moieties, said second monolayer of active molecules formed on said first monolayer of seed molecules, with a one-to-one correspondence between molecules in said first monolayer and said second monolayer [X as selected from molecules at col. 1, line 60 through col. 2, line 9];

a third monolayer of spacer molecules, formed on said second monolayer of active molecules, with a one-to-one correspondence between molecules in said second monolayer and said third monolayer [other end of molecule, col. 1, line 54]; and

a plurality of alternating second monolayers and third monolayers having said one-to-one correspondence [stacking, col. 10, lines 15-25 and 50-65], wherein said active molecules are switchable between two different states by an applied external electric field [electro-optic memory].

Devonald does not explicitly claim 1) his first stator molecule [connected to substrate] is a "seed" molecule or 2) one rotor moiety supported between two stator moieties.

Devonald teaches 1) that use of the Langmuir-Blodgett technique is superior to electric field pointing in that it produces NLO active species that are aligned in parallel. Examiner considers such a technique to read on Applicant's "seed" molecule method

and Applicant's forming "vial molecular self-assembly", especially in view of Devonald's teaching of stacking layers of like or alternate nature [stacking, col. 10, lines 15-25 and 50-65].

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to use seed molecules to form ordered layers by the preferred Langmuir-Blodgett technique to produces NLO active species that are aligned in parallel.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the seed molecule technique to produces NLO active species that are aligned in parallel.

Zhang teaches 2) the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6], wherein color change occurs through a molecular conformation change that alters the degree of electron conjugation across a said active molecule and, thereby, the highest occupied molecular orbital - lowest unoccupied molecular orbital states of said active molecule [0074], as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

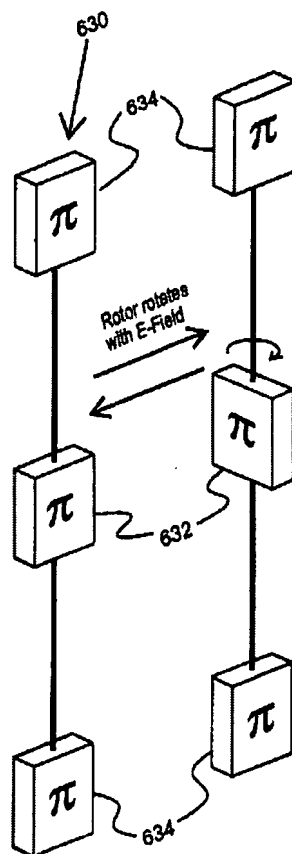


FIG. 6

Zhang is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6] as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the use of one rotor moiety supported between two stator moieties [634, both ends, Figure 6] of Zhang

Art Unit: 2871

as a preferred structure to be produced by the well known Langmuir-Blodgett technique [0106] to comprise an improved bi-stable switchable film with improved contrast [Abstract].

As to claims 13 and 29, Devonald in view of Zhang teach, as combined above, the three-dimensional molecular assembly of Claim 1.

Devonald does not explicitly teach an assembly wherein said substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer.

Devonald teaches that his films are applicable to electro-optic optical switching devices [col. 9, lines 52-57] with improved optical properties.

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add electrodes across the assembly of layers [Applicant's substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer] to comprise an electro-optic optical switching device with improved optical properties.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with a substrate comprising a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer to comprise an electro-optic optical switching device with improved optical properties.

Claims 33-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald in view of Zhang, and further in view of Vincent et al (Vincent) USPAT 6,556,470 B1.

As to claims 33-40, Devonald in view of Zhang teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Vincent teaches an electrically rotated molecular bistable switch [Abstract, col. 8, lines 21-44, and col. 12, lines 1-11] that switches between a colored state and a transparent state [Abstract] to comprise a satisfactory field addressable rewriteable media for a plurality of uses [Title and Abstract].

Vincent is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add switching between a colored state and a transparent state as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald in view of Zhang with the switching between a colored state and a transparent state of Vincent as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

Art Unit: 2871

As to claims 33-40, Devonald in view of Zhang teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Zhang, as combined above, teaches an electrically rotated molecular bistable switch [Figure 2a] that switches between a colored [black] state and a transparent state to comprise a satisfactory molecular switch with improved contrast [Abstract].

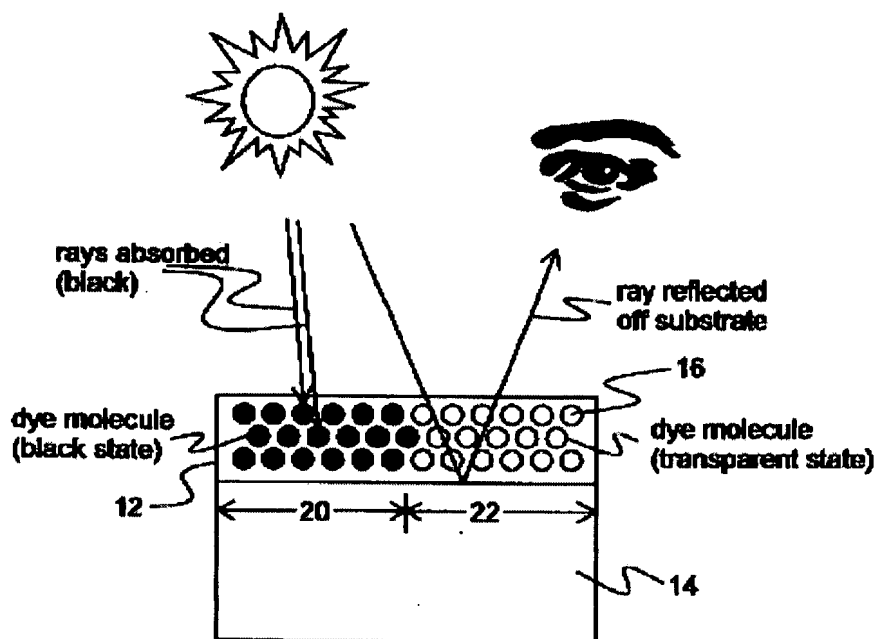


FIG. 2a

Claims 1, 13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald et al (Devonald) USPAT 5,275,924 in view of Zhang et al (Zhang2) US PG PUB 2002/0075420 A1.

As to claims 1 and 17, Devonald discloses a method of making a non-centrosymmetric bistable switchable film [(electro-optic memory) col. 9, lines 52-68 and col. 32, line 40 through col. 34, line 17] that is a three-dimensional [col. 10, lines 15-25 and 50-65] molecular switch assembly, formed on a substrate, said molecular assembly comprising:

- a first monolayer of seed molecules for initiating self-assembled molecular growth, said first monolayer formed on said substrate [end of molecule, col. 1, line 54];

- a second monolayer of active molecules comprising a plurality of rotor moieties and stator moieties, said second monolayer of active molecules formed on said first monolayer of seed molecules, with a one-to-one correspondence between molecules in said first monolayer and said second monolayer [X as selected from molecules at col. 1, line 60 through col. 2, line 9];

- a third monolayer of spacer molecules, formed on said second monolayer of active molecules, with a one-to-one correspondence between molecules in said second monolayer and said third monolayer [other end of molecule, col. 1, line 54]; and

- a plurality of alternating second monolayers and third monolayers having said one-to-one correspondence [stacking, col. 10, lines 15-25 and 50-65], wherein said

active molecules are switchable between two different states by an applied external electric field [electro-optic memory].

Devonald does not explicitly claim 1) his first stator molecule [connected to substrate] is a “seed” molecule or 2) one rotor moiety supported between two stator moieties.

Devonald teaches 1) that use of the Langmuir-Blodgett technique is superior to electric field pointing in that it produces NLO active species that are aligned in parallel. Examiner considers such a technique to read on Applicant’s “seed” molecule method and Applicant’s forming “vial molecular self-assembly”, especially in view of Devonald’s teaching of stacking layers of like or alternate nature [stacking, col. 10, lines 15-25 and 50-65].

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to use seed molecules to form ordered layers by the preferred Langmuir-Blodgett technique to produces NLO active species that are aligned in parallel.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the seed molecule technique to produces NLO active species that are aligned in parallel.

Zhang2 teaches 2) the use of one rotor moiety supported between two stator moieties [0002] as a related structure, wherein color change occurs through a molecular conformation change that alters the degree of electron conjugation across a said active molecule and, thereby, the highest occupied molecular orbital - lowest unoccupied

molecular orbital states of said active molecule [0085], to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Zhang2 is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add the use of one rotor moiety supported between two stator moieties [0002] as a related structure to comprise an improved bi-stable switchable film with improved contrast [Abstract].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with the use of one rotor moiety supported between two stator moieties [0002] as a related structure to comprise an improved bi-stable switchable film with improved contrast [Abstract].

As to claims 13 and 29, Devonald in view of Zhang2 teach, as combined above, the three-dimensional molecular assembly of Claim 1.

Devonald does not explicitly teach an assembly wherein said substrate comprises a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer.

Devonald teaches that his films are applicable to electro-optic optical switching devices [col. 9, lines 52-57] with improved optical properties.

Devonald is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add electrodes across the assembly of layers [Applicant's substrate comprises a first electrode and wherein said molecular assembly

further comprises a second electrode formed on an uppermost monolayer] to comprise an electro-optic optical switching device with improved optical properties.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald with a substrate comprising a first electrode and wherein said molecular assembly further comprises a second electrode formed on an uppermost monolayer to comprise an electro-optic optical switching device with improved optical properties.

Claims 33-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devonald in view of Zhang2, and further in view of Vincent et al (Vincent) USPAT 6,556,470 B1.

As to claims 33-40, Devonald in view of Zhang2 teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Vincent teaches an electrically rotated molecular bistable switch [Abstract, col. 8, lines 21-44, and col. 12, lines 1-11] that switches between a colored state and a transparent state [Abstract] to comprise a satisfactory field addressable rewriteable media for a plurality of uses [Title and Abstract].

Vincent is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add switching between a colored state and a transparent

Art Unit: 2871

state as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Devonald in view of Zhang2 with the switching between a colored state and a transparent state of Vincent as a desirable implementation of a field addressable rewriteable memory for a plurality of uses.

As to claims 33-40, Devonald in view of Zhang2 teach the device above.

Devonald does not explicitly disclose switching between a transparent state and a colored state.

Zhang2, as combined above, teaches an electrically rotated molecular bistable switch [Figure 2a] that switches between a colored [black] state and a transparent state to comprise a satisfactory molecular switch with improved contrast [Abstract].

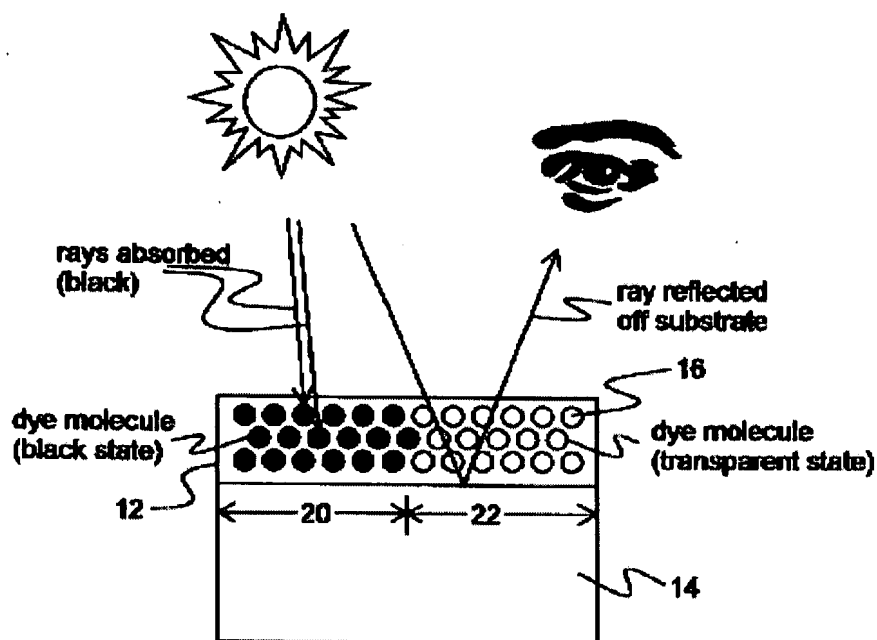


FIG. 2a

Any references cited but not applied are relevant to the instant Application.

Response to Arguments

Applicant's arguments with respect to all claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L. Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Timothy L Rude
Examiner
Art Unit 2871

tlr


6/7/07